



CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

An ISO 9001:2008 Certified Company



Job No.: CTCE/BBMP/W.No.08/KRIDL/WMM/Gradation/2012-13

28.03.2013



GRADATION FOR WMM MORTH TABLE-400-11

Client : Asst. Executive Engineer, Kodigehalli Sub Division, BBMP, Bangalore.

Agency : Technical Manager (West), KRIDL, Bangalore.

Name of Work : Improvements of Drains and Asphalting to Main Roads and Cross Roads in Ward No.08, Kodigehalli Sub Division, BBMP, Bangalore.

Reference : AEE/KOD.SUB.DIV/46/2012-13 Dated: 04.03.2013

Date of Testing : 28.03.2013

Material : WMM

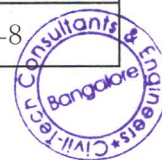
Sample Location : WMM Mix Plant

Oven Dry Wt (gm): 26000

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	1012	1012	3.9	96.1	95-100
22.4	6368	7380	28.4	71.6	60-80
11.2	5474	12854	49.4	50.6	40-60
4.75	4426	17280	66.5	33.5	25-40
2.36	3390	20670	79.5	20.5	15-30
0.600	2230	22900	88.1	11.9	8-22
0.075	2815	25715	98.9	1.1	0-8

Note:

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KE-08
ME-3097
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Assistant Executive Engineer,
Kodigehalli Sub Division,
Yelahanka Zone, B.B.M.P.,
Bangalore.

M/s. Civil-Tech Consultants & Engineers
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Job No.: CTCE/BBMP/W.No.08/KRIDL/WMM/AIV/2012-13

28.03.2013



Aggregate Impact Value

IS: 2386 Part IV

Client	Asst. Executive Engineer, Kodigehalli Sub Division, BBMP, Bangalore.
Agency	Technical Manager (West), KRIDL, Bangalore.
Name of the Work	Improvements of Drains and Asphaltting to Main Roads and Cross Roads in Ward No.08, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	AEE/KOD.SUB.DIV/46/2012-13 Dated: 04.03.2013
Source / Location	WMM Plant
Type of Mix	Wet Mix <u>macadam</u>
Date of Testing	28.03.2013

Sl No.	Details	Trial No.			Average
		1	2	3	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	386	388	389.5	21.53
2	Weight of aggregate passing 2.36 mm sieve after the test = W_2 g	82	85.5	83	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	304	302.5	306.5	
4	Aggregate Impact value = percent fines	21.24	22.04	21.31	
	$100 * (W_2 / W_1) \%$				21.53

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

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(Building, Geo-Tech & High way Material Testing Research Laboratory)
Engineering Project Consultants



Job No.: CTCE/BBMP/W.No.08/KRIDL/WMM/Shape.T/2012-13

28.03.2013

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client : Asst. Executive Engineer, Kodigehalli Sub Division, BBMP, Bangalore.
Agency : Technical Manager (West), KRIDL, Bangalore.
Name of Work : Improvements of Drains and Asphaltting to Main Roads and Cross Roads in Ward No.08, Kodigehalli Sub Division, BBMP, Bangalore.

Reference : AEE/KOD.SUB.DIV/46/2012-13 Dated: 04.03.2013

Technical Reference : IS 2386(Part 1) 1963 (RA 2007)

Type of Mix : Wet Mix Macadam

Date of Testing : 28.03.2013

Passing through IS Sieve, mm	Retained On IS Sieve, mm	Weight of Fraction (W) gms	Proportion of Size range in the sample, $X = 100 \times W / \Sigma W$	Weight of pieces of aggregates of the range, (P) in gms	Thickness gauge size, mm	Weight of flaky particles (F) in gms	Percentage by Weight of flaky aggregates in gms $Y = 100 \times F / P$	Weighted Percentage of flaky aggregates in gms $XY = X \times Y$	Weight of fraction consisting of at least 200 Pieces in gms	Length gauge size in mm	Weight of aggregates in each fraction retained on Length gauge in gms
63.00	50.00	W1	X1	P1	33.90	F1			P1	-	E1
50.00	40.00	W2	X2	P2	27.00	F2	16.44	330.19	P2	81.00	E2
40.00	31.50	W3	X3	P3	21.50	F3	13.77	251.70	P3	64.40	E3
31.50	25.00	W4	X4	P4	16.95	F4	15.74	205.41	P4	-	E4
25.00	20.00	W5	X5	P5	13.50	F5	9.48	158.67	P5	40.50	E5
20.00	16.00	W6	X6	P6	10.80	F6	9.91	117.95	P6	32.40	E6
16.00	12.50	W7	X7	P7	8.55	F7	7.57	81.77	P7	25.60	E7
12.50	10.00	W8	X8	P8	6.75	F8	11.68	75.91	P8	20.20	E8
10.00	6.30	W9	X9	P9	4.89	F9	27.31	72.18	P9	14.70	E9
		ΣW 14150.0						ΣXY 1293.79	ΣP 11793.0	ΣE 1323.0	

Result : Flakiness Index = 12.94%

Elongation Index = 11.22%

Result : Combined Flakiness & Elongation index

Note:

→ The results indicated above are based on the tests carried out on the samples received in the laboratory.

AA-08
24.16%
28.03.2013

M/s. Civil-Tech Consultants & Engineers
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Building & Highway Material Testing Laboratory

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Job No.: CTCE/BBMP/W.No.08/KRIDL/WMM/AL/2013-14



28.03.2013

ATTERBERG LIMITS TEST FOR WMM MORTH TABLE-400-11

Client : Asst. Executive Engineer, Kodigehalli Sub Division, BBMP, Bangalore.
Agency : Technical Manager (West), KRIDL, Bangalore.
Name of Work : Improvements of Drains and Asphaltting to Main Roads and Cross Roads in Ward No.08, Kodigehalli Sub Division, BBMP, Bangalore.
Reference : AEE/KOD.SUB.DIV/46/2012-13 Dated: 04.03.2013

Date of Testing : 28.03.2013

Material : WMM

Sample Location : WMM Mix Plant

As per MORTH Table 400-11

Sl. No.	Particulars	Test Results	Standards as per Specifications
1	Liquid Limit, %	21.80	25.0% Maximum.
2	Plasticity Index, %	Non Plastic	6.0% Maximum.

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AE-08
S. S. Ganga

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08.04.2013

GRADATION FOR WMM MORTH TABLE-400-11

Client : Asst. Executive Engineer, Kodigehalli Sub Division, BBMP, Bangalore.

Agency : Technical Manager (West), KRIDL, Bangalore.

Name of Work : Improvements of Drains and Asphaltting to Main Roads and Cross Roads in Ward No.08, Kodigehalli Sub Division, BBMP, Bangalore.

Reference : AEE/KOD.SUB.DIV/46/2012-13 Dated: 04.03.2013

Date of Testing : 08.04.2013

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): 25900

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	998	998	3.9	96.1	95-100
22.4	6384	7382	28.5	71.5	60-80
11.2	5582	12964	50.1	49.9	40-60
4.75	4426	17390	67.1	32.9	25-40
2.36	3635	21025	81.2	18.8	15-30
0.600	2250	23275	89.9	10.1	8-22
0.075	2340	25615	98.9	1.1	0-8

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ms. Suresh

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Job No.: CTCE/BBMP/W.No.08/KRIDL/WMM/AIV/2012-13

08.04.2013



Aggregate Impact Value

IS: 2386 Part IV

Client	Asst. Executive Engineer, Kodigehalli Sub Division, BBMP, Bangalore.
Agency	Technical Manager (West), KRIDL, Bangalore.
Name of the Work	Improvements of Drains and Asphaltting to Main Roads and Cross Roads in Ward No.08, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	AEE/KOD.SUB.DIV/46/2012-13 Dated: 04.03.2013
Source / Location	WMM Plant
Type of Mix	Wet Mix macadam
Date of Testing	08.04.2013

Sl No.	Details	Trial No.			Average
		1	2	3	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	385	386.5	387	22.40
2	Weight of aggregate passing 2.36 mm sieve after the test = W_2 g	88.5	85	86	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	296.5	301.5	301	
4	Aggregate Impact value = percent fines	22.99	21.99	22.22	
	$100 * (W_2/W_1)\%$				

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

Note:

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08.04.2013



DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client : Asst. Executive Engineer, Kodigehalli Sub Division, BBMP, Bangalore.
Agency : Technical Manager (West), KRIDL, Bangalore.
Name of Work : Improvements of Drains and Asphaltting to Main Roads and Cross Roads in Ward No.08, Kodigehalli Sub Division, BBMP, Bangalore.
Reference : AEE/KOD.SUB.DIV/46/2012-13 Dated: 04.03.2013
Technical Reference : IS 2386(Part 1) 1963 (RA 2007)
Type of Mix : Wet Mix Macadam
Date of Testing : 08.04.2013

Passing through IS Sieve, mm	Retained On IS Sieve, mm	Weight of Fraction (W) gms	Proportion of Size range in the sample, $X = 100 \times W / \Sigma W$	Weight of 200 pieces of aggregates of the range, (P) in gms	Thickness gauge size, mm	Weight of flaky particles (F) in gms	Percentage by Weight of flaky aggregates in gms $Y = 100 \times F / P$	Weighted Percentage of flaky aggregates in gms $XY = X \times Y$	Weight of fraction consisting of at least 200 Pieces in gms	Length gauge size in mm	Weight of aggregates in each fraction retained on Length gauge in gms
63.00	50.00	W1	X1	P1	33.90	F1			P1	-	E1
50.00	40.00	W2	X2	P2	27.00	F2	490	322.33	P2	81.00	E2
40.00	31.50	W3	X3	P3	21.50	F3	376	229.34	P3	64.40	E3
31.50	25.00	W4	X4	P4	16.95	F4	281	257.10	P4	-	E4
25.00	20.00	W5	X5	P5	13.50	F5	203	147.01	P5	40.50	E5
20.00	16.00	W6	X6	P6	10.80	F6	163	119.38	P6	32.40	E6
16.00	12.50	W7	X7	P7	8.55	F7	95	72.32	P7	25.60	E7
12.50	10.00	W8	X8	P8	6.75	F8	87	73.78	P8	20.20	E8
10.00	6.30	W9	X9	P9	4.89	F9	76	75.50	P9	14.70	E9
		ΣW 14424.0					ΣXY 1296.75		ΣP 11943.0		ΣE 1340.0

Result : Flakiness Index = 12.97%

Elongation Index = 11.22%

Result : Combined Flakiness & Elongation index

Note:

→ The results indicated above are based on the tests carried out on the samples received in the laboratory.

M/s. **Civil-Tech Consultants & Engineers**
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08.04.2013

ATTERBERG LIMITS TEST FOR WMM MORTH TABLE-400-11

Client : Asst. Executive Engineer, Kodigehalli Sub Division, BBMP, Bangalore.
Agency : Technical Manager (West), KRIDL, Bangalore.
Name of Work : Improvements of Drains and Asphalting to Main Roads and Cross Roads in Ward No.08, Kodigehalli Sub Division, BBMP, Bangalore.
Reference : AEE/KOD.SUB.DIV/46/2012-13 Dated: 04.03.2013
Date of Testing : 08.04.2013
Material : WMM
Sample Location : WMM Mix Plant

As per MORTH Table 400-11

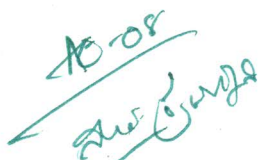
Sl. No.	Particulars	Test Results	Standards as per Specifications
1	Liquid Limit, %	22.35	25.0% Maximum.
2	Plasticity Index, %	Non Plastic	6.0% Maximum.

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Job No.: CTCE/BBMP/W.No.08/KRIDL/SDBC/Bit/2012-13

26.04.2013

BITUMEN CONTENT DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX AASHTO T 164 & AASHTO T 30

CLIENT	Asst. Executive Engineer, Kodigehalli Sub Division, BBMP, Bangalore.
AGENCY	Technical Manager (West), KRIDL, Bangalore.
NAME OF THE WORK	Improvements of Drains and Asphaltting to Main Roads and Cross Roads in Ward No.08, Kodigehalli Sub Division, BBMP, Bangalore.
REFERENCE	AEE/KOD.SUB.DIV/46/2012-13 Dated: 04.03.2013
SAMPLE I/D	Roads in Maruthinagar Ward No.08
DATE OF TESTING	26.04.2013

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	476.5	475.5
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	23.5	24.50
7. Bitumen content in %	4.70	4.90
8. Average	4.80	

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Job No.: CTCE/BBMP/W.No.08/KRIDL/SDBC/Bit/2012-13

26.04.2013

BITUMEN CONTENT AFTER GRADATION DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX AASHTO T 164 & AASHTO T 30

CLIENT	Asst. Executive Engineer, Kodigehalli Sub Division, BBMP, Bangalore.
AGENCY	Technical Manager (West), KRIDL, Bangalore.
NAME OF THE WORK	Improvements of Drains and Asphaltting to Main Roads and Cross Roads in Ward No.08, Kodigehalli Sub Division, BBMP, Bangalore.
REFERENCE	AEE/KOD.SUB.DIV/46/2012-13 Dated: 04.03.2013
SAMPLE I/D	Roads in Maruthinagar Ward No.08
DATE OF TESTING	26.04.2013

GRADATION AFTER EXTRACTION

Sieve Size in mm	Trail 1				Specified Limits as per MORTH specification table 500-4 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
13.2	0	0	0	100	100
9.5	22.36	4.69	4.69	95.31	90-100
4.75	265.4	55.70	60.39	39.61	35-51
2.36	54.82	11.50	71.90	28.10	24-39
1.18	40.16	8.43	80.32	19.68	15-30
0.3	35.29	7.41	87.73	12.27	9-19
0.075	28.47	5.97	93.70	6.30	3-8

Sieve Size in mm	Trail 2				Specified Limits as per MORTH specification table 500-4 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
13.2	0	0	0	100	100
9.5	32.61	6.86	6.86	93.14	90-100
4.75	260.4	54.76	61.62	38.38	35-51
2.36	53.22	11.19	72.81	27.19	24-39
1.18	32.57	6.85	79.66	20.34	15-30
0.3	24.58	5.17	84.83	15.17	9-19
0.075	40.63	8.54	93.38	6.62	3-8

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18-08
[Signature]

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06.05.2013

Job No.: CTCE/BBMP/W.No.08/KRIDL/SDBC/Bit/2012-13

BITUMEN CONTENT DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX AASHTO T 164 & AASHTO T 30

CLIENT	Asst. Executive Engineer, Kodigehalli Sub Division, BBMP, Bangalore.
AGENCY	Technical Manager (West), KRIDL, Bangalore.
NAME OF THE WORK	Improvements of Drains and Asphaltting to Main Roads and Cross Roads in Ward No.08, Kodigehalli Sub Division, BBMP, Bangalore.
REFERENCE	AEE/KOD.SUB.DIV/46/2012-13 Dated: 04.03.2013
SAMPLE I/D	Roads in Balaji Layout Ward No.08
DATE OF TESTING	06.05.2013

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	475	475.5
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	25	24.50
7. Bitumen content in %	5.00	4.90
8. Average	4.95	

Note:

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06.05.2013

BITUMEN CONTENT AFTER GRADATION DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX AASHTO T 164 & AASHTO T 30

CLIENT	Asst. Executive Engineer, Kodigehalli Sub Division, BBMP, Bangalore.
AGENCY	Technical Manager (West), KRIDL, Bangalore.
NAME OF THE WORK	Improvements of Drains and Asphaltting to Main Roads and Cross Roads in Ward No.08, Kodigehalli Sub Division, BBMP, Bangalore.
REFERENCE	AEE/KOD.SUB.DIV/46/2012-13 Dated: 04.03.2013
SAMPLE I/D	Roads in Maruthinagar Ward No.08
DATE OF TESTING	06.05.2013

GRADATION AFTER EXTRACTION

Sieve Size in mm	Trail 1				Specified Limits as per MORTH specification table 500-4 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
13.2	0	0	0	100	100
9.5	21.36	4.50	4.50	95.50	90-100
4.75	265.4	55.87	60.37	39.63	35-51
2.36	53.26	11.21	71.58	28.42	24-39
1.18	42.18	8.88	80.46	19.54	15-30
0.3	35.28	7.43	87.89	12.11	9-19
0.075	28.42	5.98	93.87	6.13	3-8

Sieve Size in mm	Trail 2				Specified Limits as per MORTH specification table 500-4 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
13.2	0	0	0	100	100
9.5	33.69	7.09	7.09	92.91	90-100
4.75	261.4	54.97	62.06	37.94	35-51
2.36	51.28	10.78	72.84	27.16	24-39
1.18	32.48	6.83	79.67	20.33	15-30
0.3	25.18	5.30	84.97	15.03	9-19
0.075	42.15	8.86	93.83	6.17	3-8

Note:

- ⌘ This test report should not be reproduced except in full, without written approval of the laboratory
- ⌘ The results indicated above are based on the tests carried out on the samples received in the laboratory
- ⌘ Any Query regarding the report must be reported within 15 days from the date of testing.

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